fossils was indeed a grand one, and it indicated also that the Morte Slates "vary considerably in different areas, and probably include beds of very different age."

These, his last researches, were carried out with all the enthusiasm of his earlier work, and when first announced to the Geological Society they roused as much opposition. The fact is that when he read the first paper only one *Lingula* had been found in the Morte Slates, and it was felt that the conclusions drawn by the author were not justified. Undaunted, he returned again and again to the field; he reaped a rich harvest where others had altogether failed, and if he did not succeed in demonstrating that Silurian rocks occur in North Devon, he at any rate made manifest that until better preserved fossils are obtained it is not safe to say they are not there.

Dr. Hicks became a Fellow of the Geological Society in 1871; for many years he served on the Council, he was one of the honorary secretaries from 1890–93, and president from February 1896 to February 1898. The Bigsby Medal was awarded to him by the Council in 1883. Dr. Hicks had also been President of the Geologists' Association, 1883 to 1885. He was elected a Fellow of the Royal Society in 1885. In his busy professional life he found geology a "means of recreation and of much intellectual enjoyment"; and until near the close of his life he maintained a youthful energy and vivacity, and looked the picture of health. To his many friends the sad tidings of his death at Hendon on November 18, at the age of sixty-two, came as a surprise, and everywhere raised feelings of the utmost sorrow.

H. B. W.

NOTES.

THE sum of fifteen thousand marks appears in the Budget of the German Imperial Home Office as Germany's contribution towards the preparation of an international catalogue of science.

THE *Electrician* states that a school for wireless telegraphy is being established on one of the Government hulks in Portsmouth harbour.

M. DE COPPET has forwarded to the treasurer of the French Physical Society a cheque for 1000 francs towards meeting the expenses of printing the "Receuil des Constantes Physiques."

AT the annual meeting of the Royal Institution of Cornwall held at Truro on November 21, under the presidency of the Rev. S. Baring-Gould, the Henwood Gold Medal was presented to Mr. Rupert Vallentin for his observations on the fauna of Falmouth, accounts of which are published in the last three numbers of the *Journal* of the Institution.

THE Walsingham Gold Medal of the University of Cambridge has been awarded to Mr. H. H. W. Pearson, Assistant for India in the Kew Herbarium. This medal is obtained by competition in original essays on any branch of biological science. Mr. Pearson's essay was on the botany of the Ceylon Patamas, recently published in the *Journal* of the Linnean Society.

PROF. KARL PEARSON, F.R.S., will deliver a lecture entitled "Matter and Motion" in the chemical theatre of University College, Gower-street, on December 6 at 5 P.M. The members of the Chemical and Physical Society invite the presence of all who are interested in the subject.

THE fourth international congress of psychology will be held at Paris, in connection with the international exhibition, on August 20–25, 1900. It is hoped that all who are interested in the study of psychology in its various aspects will take part in the congress. The general secretary is Dr. Pierre Janet, Rue Barbet-de-Jouy 21, Paris, to which address all communications concerning membership should be sent.

WE regret to learn, from the *Botanisches Centralblatt*, of the death of Prof. P. Knuth, at Kiel, on October 30, in the forty-fifth year of his age, shortly after his return from a long journey. Dr. Knuth had worked on the same lines as the late Dr. Hermann Müller, in collecting an immense amount of information respecting the visits of insects to flowers and their agency in cross-fertilisation. Only last year he published the first and second volumes of his "Handbuch der Blütenbiologie," in which every observation of importance made by himself or others recorded during the last quarter of a century, since the publication of Müller's "Befruchtung der Blumen," is collated. A third volume remained unpublished at the time of his death.

IT appears from a detailed article in *Engineering* that the British display at the Paris International Exhibition next year will be quite unworthy of the manufacturing power of this country. This, we need hardly remark, is a matter for deep regret, especially as our chief competitors are arranging for exhibits on a very large scale. The German display will be of the first magnitude. Thus the German exhibit in the group of appliances and general processes relating to literature, science and art, will be contained in a separate pavilion, the contents of which will be valued between three and four million marks. In the group devoted to decoration of buildings, furniture, &c., the value of exhibits is estimated at 150,000*l.*, and a similar value is set on Germany's electrical exhibits. The value of exhibited general machinery is stated to be 35,000*l.*; agricultural exhibits 20,000*l.*; the naval and military exhibit 30,000*l.*, and so on. The total value of German exhibits is estimated at a million sterling. British industries and science will only be represented by 642 exhibitors. Referring to the inferiority of the representation of Great Britain at the Exhibition in comparison with other countries, *Engineering* remarks: "Manufacturers best know what are their own interests, and they have presumably come forward in such small numbers only after careful consideration. Possibly this apparent indifference is partly due to the remarkable absence of information available about the Exhibition, and partly because of the unsatisfactory arrangement, from an exhibitor's point of view, by which exhibits will be scattered over a large area, instead of being concentrated into a British section. But whatever the causes, we must be prepared to meet our chief competitors in as many thousands as we number hundreds; if manufacturers are then disappointed, they will only have themselves to blame. One reason of our inferiority in numbers is, no doubt, to be found in the antipathy of the British industrial to co-operate in industrial exhibits. He stands alone in this prejudice, and has, of course, to pay the penalty."

THE claims of inorganic chemistry to increased attention have recently been urged in Germany on two important occasions. Addressing the Naturforscher-versammlung at Düsseldorf last year, Prof. van 't Hoff gave a most interesting review of the recent achievements of inorganic chemistry, and made a strong plea for the cultivation of this branch of the science. This plea has been put in a more concrete form at the Göttingen meeting of the German Electrochemical Society. The subject was introduced on this occasion by Prof. W. Hittorf, and the proceedings culminated in a letter addressed to the Minister of Education asking definitely for the establishment of professorships and laboratories for inorganic chemistry.

PROF. HITTORF points out how largely German chemists have deserted inorganic for organic chemistry; how, with the exception of the late Victor Meyer, hardly an organic chemist of the later school has made important contributions to inorganic chemistry; how at the present time only two of the largest Universities and one Hochschule have independent professors of the subject. He urges the cultivation of inorganic chemistry not only in the interests of technology, but from the conviction that the study, especially in relation to electro-chemistry, will give a deeper knowledge of the nature of chemical combination, and so strengthen the foundations of the whole science. He would not in the least deprecate the study of organic chemistry, but maintains that at present inorganic chemistry is in the position of a cinderella.

A NUMEROUS and influential deputation waited upon the Town Council of Edinburgh last week to urge the Corporation to give their influence towards the promotion of the movement for the establishment of a zoological garden in Edinburgh. Prof. Cossar Ewart described the advantages of zoological gardens, and pointed to what was being done to establish and carry on such institutions in the British Isles and elsewhere. Such an establishment in Edinburgh would be very valuable for the advancement of biological science, besides being a constant source of recreation and instruction to the public. Prof. Ewart remarked that though the climate of Edinburgh might not equal that of Dublin, it is better than that of Amsterdam, where there is a flourishing if not a very large zoological garden. The expenditure in Dublin is 3000*l.*, while the income, including a Government grant, is just over 3000*l.* When it is borne in mind that some 10,000*l.* or 12,000*l.* was raised in four days in connection with the recent show of the Highland Society in Edinburgh, the raising of 3000*l.* annually should not prove insuperable. Among other advantages, a zoological garden would prove a very valuable addition to the educational institutions of Edinburgh. The chairman of the School Board of the city, who was a member of the deputation, supported Prof. Ewart in this view, and pointed out that a zoological garden would be particularly valuable in connection with object lessons in natural history. In replying to the deputation, the Lord Provost said that the Corporation could not embark at the present time upon any large capital expenditure, but asked the deputation to consider what the Corporation should do in support of the movement.

IN connection with the subject of the foregoing note, the account of the New York Zoological Park given in *Forest and Stream* is of interest. This establishment was opened on November 8, at South Bronx Park, New York, and is the largest zoological garden in the world. The well-known Zoo of London has an area of 30½ acres; that at Amsterdam of only 25; that of the Société d'Acclimitation at Paris of 50 acres; that at Berlin of 60. In the United States the Philadelphia Zoo occupies 33 acres, the Cincinnati Zoo 36, while the National Zoological Park at Washington, maintained by the U.S. Government, and with an area of 168 acres, has until now been the largest zoological garden in the world. The New York Zoological Park, however, is more than one-half larger, covering 261 acres. The new park belongs to the New York Zoological Society, which was incorporated by a special act of the Legislature with purposes to establish and maintain a zoological garden in the city of New York, to encourage the study of zoology, and to furnish instruction and recreation to the people. As a condition of the grant of South Bronx Park and the maintenance of the collections and the park by the city, the Zoological Society was required to raise 250,000 dollars, of which amount 100,000 dollars was to be in hand before the society entered into occupation of the park. This fund was to be expended in the erection of the necessary buildings and inclosures, and in the purchase of collections, as well as for the general purposes of the society, but as stated, the city was to prepare the ground of the park, to maintain it in good order and to bear the expense of caring for the collections. The 100,000 dollars were raised by the New York Zoological Society, and in July, 1898, ground was broken. Recently the last touches were put on the more important buildings that have been erected. The animals began to arrive a few weeks ago, and the number already received is very large, although, of course, as yet only a beginning has been made.

THE Berlin correspondent of the *British Medical Journal* states that on the occasion of Prof. Rudolph Virchow's jubilee—the fiftieth anniversary of his tenure of office as professor ordinarius—the Senate of the University, with its rector, Prof. Fuchs, at their head, assembled to greet their revered and honoured colleague, and to present an illuminated and illustrated address, the text of which had been written by Prof. Waldeyer. In it Virchow's wonderful many-sidedness, and his achievements as investigator, archæologist, and politician were recounted in glowing terms. Prof. Virchow, who was surrounded by his family and many personal friends, in his reply gave expression to his thanks for the support which he had always met with on the part of the university, and said it was true that his chief feeling had ever been that of "the professor." In cases of conflicting interests he had always chosen the course of "professor." In the evening the Berlin Medical Society did homage to its president (Prof. Virchow) by a graceful little spontaneous ceremony. The presidential chair was wreathed and decorated with flowers and garlands, and the vice-president, Prof. v. Bergmann, greeted Prof. Virchow with a speech full of hearty good feeling, respect and admiration.

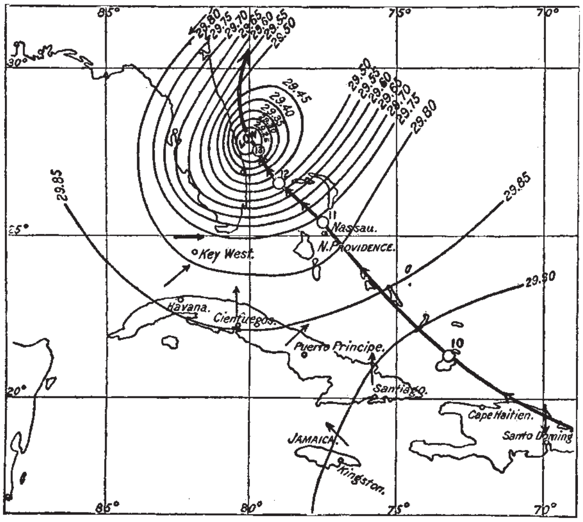
IN a letter to the *Times*, Captain G. Neville, R.N., describes what was apparently the fall of a meteorite, witnessed by him on November 19 from H.M.S. *Dido*, off the Greek coast. He remarks that during a thunderstorm which had lasted all the day "we passed between the islands of Zante and Cephalonia and were about to anchor under the shelter of Cape Clarenza for the night, when there was a sudden flash, a splash in the water about 100 yards from the ship, a report as of a 12-pounder gun being fired, and a little cloud of blue smoke over the spot where the splash had been. It looked exactly as if a shell had struck and exploded, except that there were no fragments flying about." The description suggests that a large meteorite fell in the water, and it would be worth while to attempt to find some of its parts by dredging, and to bring them to the surface.

THE following announcements are made in *Science*:—Dr. Samuel W. Stratton, associate professor of physics in the University of Chicago, has been appointed director of the Bureau of Weights and Measures, United States Coast and Geodetic Survey.—The Rumford Committee of the American Academy of Arts and Sciences has made a grant of five hundred dollars to Prof. E. B. Frost of the Yerkes Observatory, to assist in the construction of a spectrograph especially designed for the measurement of stellar velocities in the line of sight.

THE *Pioneer Mail* states that the Commission appointed to consider the advisability or otherwise of forming an Agricultural Department for Ceylon has reported favourably upon the formation of an agricultural department. It is recommended that the department should be combined with the irrigation department. Further, the Commission has recommended the appointment of four experts to be attached to the department—an entomologist, a cryptogamist, a chemist and a veterinary surgeon. The connection of the Botanical Gardens with the proposed department is not very clear; but it is understood that it will also come under the department, as will the Agricultural School.

REFERRING to the subject of standard time, Prof. Cleveland Abbe remarks in the U.S. *Monthly Weather Review*:—"Our international commercial intercourse will become precise only when we adopt Greenwich dates and Greenwich time throughout the world. This improvement, conducing as it does to the transaction of daily business, will not injure but rather be helpful to meteorology. No one has ever attempted to plot upon an ocean chart the observations of a storm by a hundred vessels at sea, but has found inextricable difficulty with records that are kept by the rules of the ancient navigators; the trouble is with the date of the month and day of the week. The modern navigator and the modern business man will do well to think, speak, and write of Greenwich days and dates only, if he would attain precision in current history."

THE West Indian hurricane of August 7–14 is described by Prof. E. B. Garriott in the *National Geographic Magazine*, from which the accompanying diagram of the storm has been reproduced. During August 7 and 8 the character and extent of the destruction caused in the Leeward Islands, Porto Rico, and Santo Domingo were such as will make the hurricane rank among the historical storms of the West Indies. At San Juan, in Porto Rico, the barometer began to fall at 10 p.m. on August 7, and the lowest recorded reading, 29·23 inches, was reached at 8·30 a.m. on August 8. The hurricane was strongest at San Juan between 7 and 9 a.m. on August 8, when the wind velocity was calculated by a U.S. Weather Bureau observer at 85 to 90 miles an hour. The rainfall was very heavy, a total of 6·37 inches falling, of which 4·18 inches fell from noon to 8 p.m. on August 8. By prompt action the U.S. Weather Bureau were able to warn many places of the approach of the hurricane centre. Prof. Garriott states that the warnings outran the storm by a period which varied from a few hours at the easternmost Leeward Islands to thirty-six and forty-eight hours at points along the South Atlantic coast and gulf parts of the United States.



The West Indian Hurricane.

THE pilot chart of the North Atlantic ocean for November contains a very useful map of the hurricane tracks during the ten-year period, 1890–99, and the distance travelled by each storm centre during twenty-four hours. With a few exceptions the tracks exhibit the usual features, the motion of the centre in that portion of the track to the southward of latitude 25° being directed towards a point between north and west, and thence moving in a north-easterly direction. The position of this point of recurvature or point of greatest westing is arranged in a tabular form. From this table it is evident that to rely upon the assertion that the storms of a particular month in the West Indies recurve within certain fixed and narrow limits of latitude may lead to serious error at a most critical time. Thus the hurricanes of September, instead of recurving between 27° and 29°, as formerly maintained, may recurve in any latitude from 20° 20′ to 33° 30′ north. Likewise those of October, instead of recurving in latitude 20°—23° north, may continue their north-westerly course until the parallel of 39° is attained.

THE Deutsche Seewarte has published in a quarto volume the results of meteorological observations made on board German ships for the ten-degree square of the North Atlantic comprised between latitude 20°–30° N. and longitude 60°–70° W. This is the seventeenth square, for which the observations have been similarly discussed and published, in the district of the North Atlantic lying between latitude 20° and 50° N., leaving but a small area to complete this very valuable work. It joins on to the nine ten-degree squares lying between latitude 20° N. and 10° S. and longitude 10° to 40° W. discussed and published some time ago by the Meteorological Council, so that shipmasters navigating that part of the ocean have at their disposal a large amount of trustworthy information extending over a considerable number of years. The observations are given in a tabular form for each month, and for each one-degree square, and the results are then combined for each five-degree square. They show the distribution of winds under 16 points of the compass, the prevalence of storms, the mean barometric pressure, air and sea temperature, duration of rainfall and other useful data, and the form adopted allows of the results of future years, or of those obtained by other countries, being added; so that, if desired, comprehensive charts, from accumulated materials, could be constructed without going through the preparatory work *de novo*.

TWO or three months ago reports were published in the daily press of the discovery of an electrical method of giving sight to the blind. It was alleged that Mr. Stiens had succeeded in constructing an electrical apparatus which performed all the functions of the eye and was an efficient substitute for it. Like many other newspaper reports of so-called scientific discoveries, this has proved to be without sound foundation. Mr. G. H. Robertson, who is himself afflicted with blindness, describes in the *Electrician* the results of personal inquiries into the matter with a member of the staff of our contemporary. In spite of several visits to Mr. Stiens, no experimental proof in substantiation of the claims which were put forward on his behalf was obtained, and the conclusion arrived at is that these claims are foundless. Life is so short and crowded with so many important duties that it is impossible to investigate the many sensational statements made by irresponsible interviewers, but we are grateful to any one who will take the trouble to examine some of the rumours which are put forward in the name of science.

IN the *Bulletin* of the French Physical Society, No. 137, is described an ingenious disposition for estimating the duration of Kerr's phenomenon, in which certain dielectric liquids are made to assume the optical properties of double refracting crystals by placing them between the plates of a condenser. The light observed is produced by the spark by which the condenser is discharged, and the time interval between the discharge and the passage of the light through the condenser may be varied by an arrangement of mirrors, whereby the rays may be made to traverse any length of path required. The experimenters, MM. Abraham and Lemoine, find from these investigations that Kerr's phenomenon is reduced to half its original value in the four-hundred-millionth of a second, and becomes insensible in the one-hundred-millionth of a second after the discharge of the condenser. MM. Abraham and Lemoine have also succeeded in showing Kerr's phenomenon for a conducting liquid. The Kerr's condenser, having water between its two armatures, is arranged in the circuit connecting two ordinary condensers in series. On discharging these by the spark used as the source of light the charges liberated instantaneously charge the plates of the Kerr's condenser. For a very small interval of time the water is affected in the same way as a dielectric, and on observing the analyser a brilliant reappearance of light establishes the existence of the phenomenon.

IN the *Bulletin International* of the Cracow Academy, M. P. Rudski continues his papers on the elastic properties of rocks. It would appear that even such rocks as granite cannot be regarded even "grosso modo" as isotropic; but the expression for the elastic potential generally involves five constants. There are no grounds for assuming the separate propagation of dilatational and torsional waves in gneiss, granite and similar rocks; on the contrary, the actual waves are partly torsional and partly dilatational.

THE *Mineralogical Magazine*, vol. xii., No. 56, which has just appeared, contains a description of a new three-circle goniometer designed by Mr. G. F. H. Smith, and intended for comparatively rapid measurements of the geometrical constants of crystals and the indices of their faces. The paper gives a historical account of the one-circle goniometer of Wollaston, the two-circle or "theodolite" goniometer of Miller, and then describes the new instrument, which is a combination of those forms. The great advantage of the combination is that the crystal is adjusted once for all. The measurements may be made in any desired zone, the orientation of which is at once determined. For crystals small enough to be firmly held by wax in all positions, the most convenient arrangement is to give all three motions to the crystal; but, if necessary, the telescope and collimator may have one or more.

THREE noteworthy papers on the cultivation and manufacture of tobacco have recently appeared. One of these publications is Report No. 60 of the U.S. Department of Agriculture, and in it Mr. Milton Whitney and Mr. T. H. Means describe their investigations upon the temperature changes in fermenting tobacco in Florida and Connecticut. The report also comprises a *résumé* of Dr. Oscar Loew's investigations of the cause of fermentation, which throw light upon and explain the observed temperature changes, and the necessity of maintaining a definite amount of moisture in the tobacco during the curing and fermentation. In another paper (Report No. 62), published by the U.S. Department of Agriculture, Mr. Marcus Floyd describes the cultivation of cigar-leaf tobacco in Florida, where striking developments of the tobacco industry have taken place in recent years. The object of collecting information of this kind is to investigate whether the crops produced on the various types of tobacco soils are the best obtainable with the present state of knowledge and skill in manipulation. In this way the Department of Agriculture is making a scientific study of the possibilities of the improvement and extension of an important industry. The third paper mentioned, on the cultivation and manufacture of tobacco, appears in the *Revue Générale des Sciences* for October 30, and is accompanied by a map showing the districts in which tobacco is cultivated in France.

"THE Geology of the Country around Dorchester" is the title of a Memoir (price 1*s*.) just issued by the Geological Survey in explanation of the new series map, No. 328. The Memoir is written by Mr. Clement Reid, and it deals mainly with the chalk, eocene strata and drift. Among the more interesting natural features in the region are the numerous swallow-holes on Puddletown Heath and adjacent tracts. Perhaps the largest is that known as Cull-pepper's Dish, a hollow about one hundred yards long and forty feet deep. Another is known as Hell Pit. Altogether there are some six hundred of these pits, due to the dissolution of the chalk and the subsidence of superincumbent tertiary deposits. Mr. Reid points out that the lower tertiary (Reading) beds consist locally of sands with impersistent beds of clay. The rainfall readily sinks into the porous ground until arrested by one of the clay-bands, and these guide the water in particular directions, whence it descends and dissolves the chalk. The Reading beds and London clay vary considerably from their equivalents elsewhere, the London clay consisting largely of sand and sandy loam. The Bagshot beds furnish evidence of true river-deposits which replace the more estuarine strata of the eastern part of the Hampshire basin. Large pits near Moreton station show (beneath plateau gravel) Bagshot beds comprising current-bedded sand, pipe-clay and gravelly seams containing chalk-flint, Greensand chert, Purbeck limestone, Radiolarian chert, and Schorl-rock. Here, in fact, are found fragments of all the rocks which occur further west in gravels which have been regarded as drift, but which Mr. Reid considers, with good reason, to be of Bagshot age. The accounts which he gives of these and other deposits will be read with interest. Among the latter we may mention the Pliocene formation at Dewlish, the clay-with-flints, plateau gravels, and more recent deposits.

SOME interesting experiments on the rate of multiplication of various yeast cells have been carried out by Dr. D. P. Hoyer, of Vienna, and are published in the *Centralblatt für Bakteriologie*, Part ii., No. 21. The author has determined the time required at different temperatures, 13° C. and 20° C. and 25° C. respectively, by various yeasts to produce a new generation from a parent cell. Thus at 13° C., *S. ellipsoideus I. Hansen* requires nine hours and four minutes, and at 25° C. six hours and twelve minutes; *S. membranae-faciens* at 13° C. seven hours and one minute, and at 25° C. five hours and thirteen minutes to form a new generation. At 6° C. it appears that the majority of the yeasts investigated did not, even after a week, produce a new generation, and the experiments conducted at this temperature were discontinued. The yeasts thus so closely scrutinised were grown on gelatine, and were not more than from three to four days old. Many bacteria have been submitted to similar observations; but until these experiments, made by Dr. Hoyer, were published, scarcely any investigations of this kind, in regard to yeasts, have been recorded.

THE *Bulletin of Miscellaneous Information* (Trinidad) for October contains a fuller diagnosis of the new fungus-parasite of the cacao-plant, *Nectria Bainii*, Mass. It seems, however, still doubtful whether it is the cause of the disease, or simply saprophytic.

IN the number of the *Agricultural Gazette of New South Wales* for October is a very interesting further account, by Mr. J. H. Maiden, of a botanical visit to Mount Kosciusco. The flora presents some Alpine features, but the flowers are not specially large or brilliant. There is an extraordinary predominance of white flowers, almost exactly one-half of those gathered at high altitudes. The flora presents, on the whole, a strong affinity with that of Tasmania. A list of the plants collected is appended.

THE *Journal of the Royal Horticultural Society* for November, besides purely horticultural papers, contains several *résumés* of the present state of our knowledge in various branches of botany:—On the dispersion of seeds, by Prof. Boulger; and on the importance of light and heat to plants; on movements of plant organs; and on fertilisation by insect agency, by the Rev. G. Henslow, read at the meetings of the Society. In the last of these papers, Mr. Henslow sums up strongly against Darwin's dictum that "Nature abhors perpetual self-fertilisation," which, however, he quotes as "Nature abhors self-fertilisation," an assertion never made by Darwin.

THE second volume of Dr. Isaac Roberts' "Photographs of Stars, Star Clusters and Nebulæ" is about to be issued from the publishing office of *Knowledge*. It will contain seventy-two photographs reproduced by the collotype process, in addition to many pages of text. Only a limited number of copies of the work will be available for the public.

A SECOND fully revised edition of "The Physiology of Plants: a Treatise upon the Metabolism and Sources of Energy in Plants," by Dr. W. Pfeffer, professor of botany in the University of Leipzig, translated and edited by Dr. Alfred J. Eward, will be issued immediately from the Clarendon Press.

THE members of the St. Marylebone Natural Science Society apparently derive a large amount of pleasure and instruction from one another, for the report on the meetings held during the present year shows that a number of interesting papers on diverse subjects were read before the Society. Every organisation which creates and fosters a love of natural knowledge furthers the interests of science; therefore, we are glad to know of the activity of the scientific society of St. Marylebone.

THE only ionising inorganic solvents hitherto found in addition to water are nitric acid and liquefied ammonia. In the current number of the *Berichte* Prof. Walden, of Riga, gives a preliminary account of experiments with liquid sulphur dioxide, which shows that this liquid acts to an unsuspected degree as a solvent for inorganic and organic substances. Since it permits of double decompositions, and gives electrolysable solutions, liquid sulphur dioxide must now be reckoned as an ionising solvent. Many substances dissolve in liquid sulphur dioxide with characteristic colours. Thus the iodides of the alkalis and alkylammoniums dissolve with a yellow colour. As an example of double decomposition, the action of potassium iodide on trimethylammonium chloride may be cited. These substances in sulphur dioxide solution give a precipitate of potassium chloride. Ferric chloride and ammonium sulphocyanide give the usual red colour of ferric sulphocyanide. The electrical conductivity of salts in sulphur dioxide solution is not the same in order as that in aqueous solution, nor does the molecular elevation of the boiling point in liquid sulphur dioxide correspond altogether with that found in aqueous solutions. Prof. Walden promises a thorough investigation of the many points of interest raised by this new discovery.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*, ♂) from South Africa, presented by Mrs. A. Rousbey; a Persian Gazelle (*Gazella subgutturosa*, ♂), a Chaplain Crow (*Corvus capellanus*) from Persia, presented by Mr. B. T. Ffinch; two Chipping Squirrels (*Tamias striatus*) from North America, presented by Mr. C. M. Stewart; two Snake Fishes (*Polypterus senegalus*) from the River Gambia, presented by Mr. J. S. Budgett; an Indian Antelope (*Antilope cervicapra*, ♂), a Banded Parrakeet (*Paloeornis fasciatus*) from India, a Sooty Phalanger (*Trichosurus fuliginosus*, ♂) from Tasmania, a Fennec Fox (*Canis cerdo*) from North Africa, deposited; two Red-backed Buntings (*Emberiza rutila*) from Japan, purchased.

OUR ASTRONOMICAL COLUMN.

HOLMES' COMET (1899 *d*).

Ephemeris for 12*h*. *Greenwich Mean Time.*

1899.	R.A.			Decl.		
	h.	m.	s.	°	′	″
Nov. 30	... 2	8	58·72 ...	+46	44	50·0
Dec. 1	...	8	24·88 ...		36	25·1
2	...	7	53·24 ...		27	54·2
3	...	7	23·83 ...		19	18·2
4	...	6	56·65 ...		10	37·7
5	...	6	31·72 ...	46	1	53·4
6	...	6	9·05 ...	45	53	5·9
7	... 2	5	48·62 ...	+45	44	16·0

COMET GIACOBINI (1899 *e*).

Ephemeris for 12*h*. *Berlin Mean Time.*

1899.	R.A.			Decl.	
	h.	m.	s.	°	′
Nov. 30	... 18	4	13 ...	+12	13·7
Dec. 1	...	5	55 ...	12	30·5
2	...	7	36 ...	12	47·4
3	..	9	18 ...	13	4·4
4	...	11	0 ...	13	21 4
5	...	12	42 ...	13	38·5
6	...	14	24 ...	13	55·7
7	... 18	16	7 ...	+14	13·0

SPECTROSCOPIC BINARIES.—(1) α *Aurigæ* (*Capella*). Prof. W. W. Campbell, from examination of six spectrum plates of the star obtained with the Mill's spectrograph during 1896–97, finds decisive evidence of its being a spectroscopic binary. The component having a spectrum of the solar type showed velocities of 34, 54, 49 and 3 kilometres per second from 1896, August 31, to 1897, February 4. The spectrum of the second component appears to consist chiefly of Hγ and the more prominent iron lines (*Astro. Physical Journal*, vol. x., p. 177). (2) α *Ursae Minoris* (*Polaris*). Photographs of the spectrum obtained in 1896 showed no decided evidence of variable velocity. Others taken in August 1899 gave such different values, ranging from −15·2 to −9·0 kilometres per second, that the star was suspected to be a short period variable, and a curve was plotted from additional observations specially made. (*Astro. Physical Journal*, x., p. 180). The 1896 values of the velocity lie altogether out of the recent measures, and this is the reason assigned for suspecting the presence of a disturbing force in the form of a third component. The period of the chief pair is about 3d. 23h. All the observations were made with the Mill's spectrograph on the 36-inch refractor.

In the same number of the *Journal*, p. 184, Prof. E. B. Frost, of the Yerkes Observatory, gives the velocities in the line of sight of this star, obtained from spectrograms taken with the 40-inch refractor. The resulting values quite confirm the short period variation found by Prof. Campbell, and the range in velocity (7 kilometres) is also closely in agreement.

POSITION OF PERTH OBSERVATORY.—Mr. W. E. Cooke, Government Astronomer at the Perth Observatory, Western Australia, has recently, with the co-operation of Sir Charles Todd, of the Adelaide Observatory, determined the latitude and longitude of the station. The latitude was determined by observations of meridian zenith distances of circumpolars, and the final adopted value is

Latitude 31° 57′ 09″·63 S.

The longitude was found by interchanges of clock signals between Perth and Adelaide, the adopted value being

Longitude = 7h. 43m. 21·74s. E.

VARIATIONS IN THE SPECTRUM OF ORION NEBULA.—Prof. Scheiner, in the *Astronomische Nachrichten*, Bd. 150, No. 3593, made some lengthy criticisms of Prof. Keeler's observations of the spectrum of the Orion Nebula, obtained with the Lick telescope. Prof. Keeler's reply is given in No. 3601, and the *Astro. Physical Journal*, vol. x., pp. 164–8, contains both the reply and a translation of Prof. Scheiner's article. The experiment consisted in obtaining two photographs of the nebula, one on an ordinary plate, the other on an isochromatic plate protected by a greenish-yellow screen. The resulting negatives showed considerable differences in the relative intensities of several parts of the nebula. Prof. Scheiner pointed out the doubtful comparison of different types of plates, the